



Mitigating inequality with emissions? Exploring energy justice and financing transitions to low carbon energy in Indonesia

Abidah B. Setyowati

School of Regulation and Global Governance (RegNet), Australian National University, 8 Fellow Road, Canberra, ACT 2601, Australia

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ABSTRACT

Many countries around the globe demonstrate a growing commitment to achieve universal electrification in alignment with Sustainable Development Goal 7. Indonesia is among the countries that have made a concerted effort to alleviate energy poverty, mindful that around 25 million of its citizens live without access to electricity. This article examines Indonesia's efforts to realize its vision of energy justice by mobilizing private finance for renewable rural electrification. In particular, it investigates to what extent and in what ways Indonesia has addressed energy justice issues and their social implications. Interviews and document analysis reveal that Indonesia's energy justice vision has manifested in policies and initiatives that focus narrowly on distributive energy justice in terms of energy accessibility and affordability. However, procedural and recognition aspects of energy justice remain unaddressed. Such a myopic interpretation of energy justice has resulted in policies that prioritize large scale and on-grid solutions and substantially reduce financial options for small and distributed renewable energy initiatives. It also perpetuates spatial inequality and reinforces the exclusion and disempowerment of energy poor communities from energy decisions. The findings suggest that for a broader energy justice vision to be realized, it will be necessary to design and implement energy policies that holistically address all elements of energy justice and facilitate the use of diverse forms of finance to address energy poverty.

1. Introduction

Energy poverty remains a key global challenge.¹ It is estimated that around 789 million people are still without access to electricity in 2018, the majority of whom live in developing countries [2]. Recognising the importance of addressing energy poverty, the United Nations has included access to electricity as a part of Sustainable Development Goal (SDG) 7, specifically to ensure access to affordable, reliable and sustainable modern energy for all. Indeed, the former UN Secretary-General, Ban Ki Moon, dubs energy access as 'the golden thread' that links economic growth, social equity and environmental sustainability [3]. Although important, progress towards achieving SDG 7 remains slow [3]. The challenge of delivering on SDG7's aspirations is compounded by the fact that reducing energy poverty must be achieved in ways that also mitigate climate change, given individual country pledges under the Paris Climate Agreement.

Mitigating energy poverty while also achieving a rapid transition to low carbon development will require the mobilization of massive global investment, which is estimated to reach USD 93 trillion by 2035 alone

[4]. At the international level, developed countries have pledged to mobilize at least USD 100 billion per year in climate finance for developing countries by 2020 [5]. However, recognising the limits of government resources and international aid budgets, countries will also need to harness finance from private sources, to support the transition to low carbon energy [6,7].

Although energy poverty has been considered a prime example of energy injustice, approaches to address it rarely consider the wider justice issues. For example, while SDG 7 embodies the distributive justice aspect of addressing energy poverty, broader justice consideration is often ignored in policies and initiatives [8,9]. Further, efforts to improve energy access using low carbon solutions could result in various forms of injustice such as limited public participation in decision making processes (procedural injustice), and continued exclusion of marginalized groups from energy services and decisions (misrecognition of justice) [8,10]. The dominant technical-managerial framing of global initiatives aimed at addressing energy poverty also often obscures the power relations and broader economic structures that shape energy outcomes [9]. Studies highlight the need to examine the impacts of private

E-mail address: abidah.setyowati@anu.edu.au.

¹ Energy poverty is broadly understood as limited access to socially, environmentally and materially necessitated level of energy services in the home, including access to electricity [1].

investment to support a transition to low carbon energy [11–13]. In other sectors, such as the water sector, in the absence of good governance, private investment often yields poor outcomes as a result of prioritizing investors' private returns over social and environmental benefits [12].

To better understand how different elements of energy justice might best be addressed, an empirical approach is necessary. However, in the context of Southeast Asia, very little such empirical work has been undertaken. This study seeks to reduce this empirical gap by focusing on Indonesia's efforts to ameliorate energy poverty using low carbon technologies. Its objective is to examine how and to what extent various dimensions of justice have been included in initiatives aimed at addressing energy poverty, with a focus on private sector participation and investment in renewable rural electrification. It further interrogates the social implications of these policies and initiatives. Finally, it explores new approaches potentially capable of encapsulating different aspects of justice.

Renewable rural electrification is chosen as the empirical focus because in outlying areas within which most energy poverty is found, this is commonly the most viable mitigation technology. In Indonesia, nearly 25 million people still lack access to electricity, many on outlying islands or other remote areas where logistical problems and a sparsely distributed population preclude grid-based solutions [13]. The government has made concerted efforts to address the country's energy poverty under Widodo's administration (2014-present). It has done so mindful to realize a distinctive vision of energy justice (*energy berkeadilan*). Indonesia's Ministry of Energy and Mineral Resource (MEMR) explicitly incorporates the principle of energy justice within its policies and programs. Such an aspiration is arguably the embodiment of the country's foundational principles of Pancasila,² particularly the fifth principle 'social justice for all' and is also consistent with Article 33 of the Constitution which stipulates that the state's control over productive sectors, including energy, should be managed in an efficient and just manner [14]. This has been achieved, among other initiatives, through rural electrification projects.

Until recently, diesel generators were viewed as a standard rural electrification solution. However, with Indonesia's commitment to reduce carbon emissions and meet its Paris Climate Agreement target, the country has explored options for low carbon technology solutions to address energy poverty. Crucially, such solutions must be financed, and this is a considerable challenge, given Indonesia's commitment to achieve a renewable energy target of at least 23 percent of total energy generation by 2025, which would require a funding injection of an estimated USD 36.95 billion [15]. Such a level of funding is beyond the resources and capabilities of the state and as a result, much of this amount must be mobilized from private financial sources.

This article demonstrates that Indonesia's energy justice vision has manifested in policies and programs aimed at mitigating energy poverty that have focused narrowly on the distributive aspect of justice, particularly on ensuring affordable and accessible energy. In this article, I argue that such a myopic interpretation of energy justice has resulted in policies that favour large scale and on-grid solutions and substantially reduce financial options for small and distributed renewable energy initiatives. Instead, private financial sources primarily flow to large-scale renewable energy projects with lower risk and higher returns and which, for the most part, are limited to the areas with high installation capacity. As a result, the existing spatial inequality of electricity access is reinforced. Moreover, current policies and programs disregard energy demands and needs of different social groups, such as indigenous, minority and lower economic level groups, and provide limited space for various actors to meaningfully engage in energy decision-making processes.

² Pancasila is the philosophical basis of the modern Indonesian state, which is comprised of five principles that are inseparable and interrelated.

The article proceeds as follows. Section two provides an overview of energy justice and financialization of energy debates and their relevance to efforts to alleviate energy poverty. Section three presents the energy policy dynamics in Indonesia, particularly those aimed at addressing energy poverty through mobilizing private climate finance for renewable rural electrification. Building on this foundation, the fourth section describes the research methodology. The fifth section analyses the data from the perspective of energy justice theories. This is followed by a discussion of the implications to the attainment of energy access for all. The paper concludes by summarizing key arguments and detailing the implications of the research findings for the current and future evolution of energy policy in Indonesia and beyond.

2. Energy justice and the financialization of energy: A review

The analysis of this article is informed by two strands of literature: energy justice and the financialization of energy. The emerging literature on energy justice draws on longstanding debates and scholarship on environmental justice [16–18] and on an evolving literature that examines the social justice implications of a transition to low carbon energy [19–22]. Scholars in this tradition argue that the transition to low carbon energy could reproduce patterns of inequality that have long plagued the fossil fuelled based energy system. Thus, the justice framework could inform the design and implementation of policies that promote a more equitable and inclusive energy transition.

Informed by normative dimensions of environmental justice—distributive, procedural and recognition—energy scholars theorize a triumvirate of energy justice tenets [19–20,23]. *First*, distributive energy justice concerns an equal distribution of benefits and burdens related to energy production and consumption. It is an inherently spatial concept that includes an examination of unequal patterns in terms of physical location and dissemination of energy goods and ills [23]. For instance, some studies show that poor and marginalized social groups are often disproportionately affected by the siting of energy production facilities [20,24]. Thus the construction of solar development in Chile has resulted in distributive injustice in which people living around the facilities, mostly poor and indigenous communities, are unable to access the electricity generated as the solar power plants export their energy to industries and the cities [24].

Second, procedural justice focuses on ensuring equal and meaningful participation of all stakeholders in energy decisions [19,20]. It includes an evaluation of whether and to what extent decision making processes regarding energy are inclusive and democratic. Procedural justice opens avenues for remediation through the use of appropriate mechanisms to meaningfully engage stakeholders in decision making processes, such as informational disclosure and procedures and mechanisms to ensure participation, transparency and due process.

Third, recognition justice acknowledges the distinct identities and histories of people in relation to the energy system and seeks to eliminate forms of socio-cultural domination of some groups over others [20,21]. In the case of the mega solar project in Charanka, India, for instance, the nomadic Rabaris people have been inadequately represented in the construction of a solar park [8]. This situation is exacerbated by the existing caste system that results in the decision-making process being predominantly shaped by the high-caste landowners' interests and interests. It is important to note that these three tenets of energy justice are closely linked, with the result that the failure to adhere to one tenet of justice could hamper the attainment of other tenets [20–23,25]. For example, the inability to recognize those who could be disenfranchised from the energy decision-making process could lead to ineffective participation and unequal distribution of benefits associated with energy services.

Recent studies examine the role of finance in the energy transition, noting a rapid increase in private investment and participation in the renewable energy sector [13,27]. These studies interrogate the social, political and economic implications of a growing shift from public to

private finance and towards innovative measures that serve to mobilize private finance in the energy transition such as feed-in tariffs and competitive reverse auctions. Scholars argue that the establishment of renewable energy generation underpinned by the risk-return logic of finance could adversely impact attempts to address energy poverty as it could lead to speculative investment decisions, obscured ownership structures due to increasingly distanced capital sources from actual productive assets and investment flows predominantly to large-scale projects with substantial investment return [13,27]. Yet, attempts to address energy poverty, particularly in archipelagic nations like Indonesia, often need small-scale projects using distributed renewable energy technology. With the exception of Hall et al. [11], the social justice implications of energy financialization remain underexplored. This study aims to contribute to addressing the gap in the literature.

While studies on energy justice are growing fast in the developed world, such debates are relatively nascent in developing countries, particularly in Southeast Asia. Using an energy justice lens to examine the process of energy transitions in developing countries would enable a better understanding of whether, to what extent or in what ways, energy injustice is being perpetrated as these countries engage in a low carbon energy transition. In Indonesia, the academic literature on the energy transition is still largely dominated by a techno-economic analysis e.g. [28,30]. While this perspective is useful, very few studies of Indonesia's energy transition informed by governance and political economic perspectives exist [e.g. 31–33].

This article contributes to and expands these literatures by utilizing the justice lens to understand the implications of mobilizing private climate finance for renewable rural electrification in Indonesia to address energy poverty. This article also answers a recent call to pay attention to actors and power relations that produce environmental injustice [34] by situating the analysis of the data within Indonesia's broader institutional and political economic milieu. Indeed, the energy transition is not simply an economic and technical phenomenon, but also has political and ecological dimensions, and is shaped by existing social relations and institutions, which play out across scale and space [35].

3. Electricity access and renewable energy in Indonesia

Despite an expansion of electricity access in recent years, it is estimated that around 2500 villages are still without access to electricity in Indonesia [36]. Far from being evenly distributed across the country, particular locations are disproportionately disadvantaged. In short, there has been persistent uneven geography of access to electricity (see

Fig. 1). While the western part of Indonesia, particularly Java and Sumatra Island, enjoys a relatively stable electricity supply and a reliable grid system, the middle and eastern parts of the country still suffer from regular power blackouts and power deficits [29,31]. Moreover, Indonesia encounters unique challenges in designing, constructing and operating its electricity network due to its archipelagic geography with over 17,000 islands spanning the country. Most of the areas that remain without access to electricity are geographically isolated places and remote islands. Providing electricity to such locations could be an expensive undertaking due to logistical issues, long distance travel, poor infrastructure and a fragmented distribution network [30,37].

The Indonesian government has increasingly made concerted efforts to eradicate energy poverty by launching an ambitious target to achieve universal electrification by 2025. It aims to prioritise the use of renewable energy sources to electrify rural and remote areas. Approximately 1400 MW of renewable energy projects need to be developed to meet this energy target [38]. Although the government currently focuses on large scale centralized renewable technologies—especially hydro and geothermal power—solar and wind hold much potential, particularly in remote areas where other renewable technologies may not be accessible or economically viable.

The state-owned electricity company, Perusahaan Listrik Negara/PLN, has an important role to play to alleviate energy poverty given its powerful position in electricity generation, transmission and distribution in Indonesia. This powerful position is a manifestation of the constitutional mandate that all vital utilities, including electricity, must be controlled by the state (Article 33). As a state-owned company, PLN bears the responsibility for providing reasonably priced electricity for all Indonesians. Historically, rural electrification has been dominated by centralized grid expansion conducted by PLN. Despite a substantial increase in state budget allocation over the years for the PLN's grid extension in rural areas and routine large capital transfer from the government to make up for its revenue shortfall, the company has continually struggled to meet the country's fast growing electricity demands [39,40].

As the government is well aware, private sector participation and investment in the electricity sector must be increased to overcome the energy shortfall. It has stipulated several regulatory frameworks to broaden the private sector's participation and encourage private investment in the electricity sector. For instance, Electricity Law 30/2009 allows a greater space for Independent Power Producers/IPPs (namely private enterprises, cooperatives and community institutions) to participate in electricity provision. A government regulation on Electricity Supply Generation (Government Regulation/GR 14/2012,

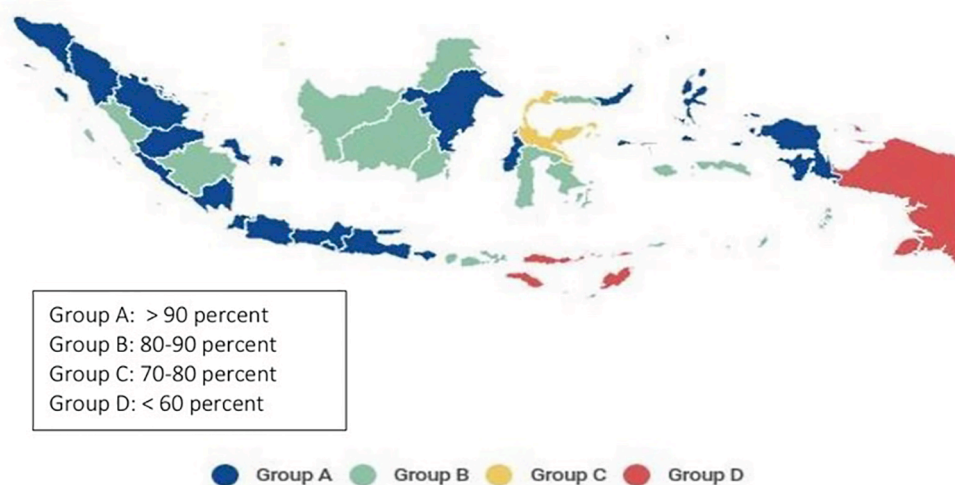


Fig. 1. Electrification Ratio in Indonesia in 2017 [36].

revised with GR 23/2014) has also been introduced which serves as the legal basis for buying renewable generated power from IPPs. For on-grid electricity, IPPs can produce electricity, but they are required to sell it to PLN for distribution. However, for off-grid electricity, IPPs are allowed to generate, transmit and distribute electricity directly, but only pending government approval in consultation with PLN. Moreover, the government stipulates MEMR Regulation 50/2017 on the utilization of renewable energy for power supply to stimulate private investment in the renewable energy sector.

To accelerate rural electrification, the government issued MEMR Regulation 38 of 2016 that focuses on enhancing access to electricity in remote, underdeveloped border areas and inhabited small islands through small scale electrification projects. It broadens the opportunity for IPPs by incentivizing them to participate in rural electrification. In so doing, this regulation includes a provision that allows IPPs to access a government subsidy provided that the provincial governor and the MEMR give their approval. PLN and the MEMR have implemented several rural electrification programs, such as establishing microgrids and distributing solar-powered energy-saving lamps (*Lampu Terang Surya Hemat Energi/LTSHE*).

As a result, official figures suggest an impressive increase in access to electricity, which reached a 98 percent electrification ratio in 2018 [36]. However, the electrification figure grossly overstates actual access, which can be as little as one or two hours a day, with variable reliability and quality [30,41]. Moreover, routine power outages continue especially outside Java and the maintenance of small-grids and mini-grids system in remote areas has been a challenge [29]. Despite attempts to broaden participation in the electricity market since the 1990s through power purchase agreement (PPA) schemes, PLN has conceded very little space to other potential electricity providers. To date, PLN and its subsidiaries retain control of the large majority of electricity generation in the country (some 77 percent), with the rest coming from private power utilities (PPUs) and independent power producers (IPPs) [42].

4. Methods

The analysis presented here is based on data collected through three months of fieldwork in Indonesia undertaken during mid-February - April 2019 and January 2020. Responding to a recent call for qualitative inquiry to better capture issues of power and justice in energy research across different scales [43,44], I employed multi-sited ethnographies, which consisted of two main activities: First, semi-structured interviews were conducted with key stakeholders in renewable energy and climate finance at national and subnational levels. Purposive sampling was used to capture the network of actors who engaged in policy and initiatives related to renewable energy and climate finance in the country [45]. Initial informants were identified using publicly available information concerning energy and climate finance stakeholders, together with my professional networks. They were then asked to identify other key stakeholders through a process of snowball sampling. A total of 64 respondents participated in the interviews. The interviews generally lasted thirty minutes. Those interviewed included 18 national/subnational policy makers, 8 banking/finance institutions, 10 renewable energy developers, and 19 NGOs/research institutions/community organizations. Interview questions consisted of relevant thematic issues related to their experiences and engagement in renewable energy policies/programs and climate finance. Questions also sought to explore key informants' perceptions on how different elements of energy justice play out in policy/program formulation and implementation.

Second, field observation was carried out to investigate the implementation of renewable energy projects in Sumba Island, Nusa Tenggara Timur and Sidenreng Rappang District, South Sulawesi Province. Both cases are located in the eastern part of Indonesia, which are among areas with the lowest electrification rate in the country. In Sumba Island, the Sumba Iconic Island program was launched in 2010 with a target of increasing the electrification ratio by 95 percent by 2020 using

renewable energy sources such as solar, wind, micro hydropower, and other sources [46]. In Sidenreng Rappang District, a wind farm was established in 2018. It is expected to generate 75 MW of electricity and supply electricity for up to 70,000 households in the region [47]. The selection of cases for field observation was not for comparative purposes but rather was exploratory [48]. They were examined to understand how different elements of justice are manifested in the development and implementation of renewable rural electrification projects. Due to limited time spent in these study sites, longer ethnographic research is needed to capture detailed social justice implications of renewable energy initiatives in specific communities.

The qualitative interviews and field observation were complemented by a detailed analysis of government documents, including policy, regulations and reports, media and other articles on renewable rural electrification and climate finance for supporting energy transitions in Indonesia. The collected data sets were analysed using qualitative methods of content analysis, grounded theory and discourse analysis [49]. These data were coded and analysed to identify emerging themes and key ideas particularly related to different elements of justice and to explore their connections, (in)consistencies and contradictions [45]. Credibility, trustworthiness and reliability of the data collected were ensured through triangulation, which includes using several types of data collection (secondary and primary data) and relying on multiple informants to address similar questions.

5. Results and discussion

This section unpacks how and to what extent different elements of energy justice have been included in policies and initiatives aimed at increasing private participation and investment in renewable rural electrification. In particular, it focuses on evaluating three tenets of justice: distributive, procedural, and recognition justice. The section further discusses the implication of inability to address different elements of justice in efforts to overcome energy poverty in terms of electricity access in rural areas.

5.1. Distributive justice

The discourses of energy justice have been articulated in various energy policy narratives and documents. These emphasise distributive justice - particularly providing affordable and accessible energy to all people, which by implication is prioritised above other tenets of justice. For instance, Energy Law 30/2007 stipulates a provision that the energy price must be set based on reasonable economic value and in a just manner and that the government shall provide a subsidy for poor communities (Article 7). Further, the Electricity Law 30/2009 includes a provision to provide affordable, good quality and sufficient quantity of electricity to people in a just and equitable manner. Under Joko Widodo's administration, the policy priority has been ensuring energy access and affordability for all people which manifests in policy approaches such as restructuring the price subsidy and rationalization to better target poor communities [50]. Through the One Price Fossil Fuel policy (*BBM satu harga*), for example, the government attempts to ensure a similar fossil fuel price across the country through restructuring fuel subsidy. This approach was taken to address the fluctuation of the fossil fuel price which tended to become much more expensive outside Java, particularly in the eastern part of Indonesia. In the electricity sector, Widodo's administration interprets the energy justice vision in terms of ensuring energy access for all and price affordability, regardless of the energy source [13,40].

In contrast to the policy aspirations and instruments identified above, the interview data shows that most key informants are acutely aware of the spatial injustice of energy access: this being the limited access to electricity that is most pronounced in the eastern part of Indonesia, where people often lack reliable and secure access to electricity (see Fig. 1). Recognizing the extent of this uneven access to

electricity, one of the main strategies of the government has been to stimulate private sector participation and investment in the renewable energy sector, particularly in the areas that suffer energy poverty [37]. Arguably, the most notable regulation related to this is MEMR 50/2017 on renewable energy power generation. This expands the space of IPPs in the renewable energy sector and includes a provision that establishes a geographically differentiated price to incentivise renewable energy investments in areas with low electrification rates and high-energy costs. For instance, the lowest electricity price is set at USD 6.81 cent/kWh in the Java and Bali area (with some exceptions), while the highest price is set for USD 20 cent/kWh in the eastern part of Indonesia and outlying islands [37].

This strategy purports to attract private investment in renewable rural electrification in areas that otherwise would not be attractive for such investment, particularly in the eastern part of Indonesia. As described by a key government officer (interview government officer #1, 14/3/19),

'We design the regulation that recognizes the geographical difference of cost production (BPP) by setting up a higher price especially in the eastern part of Indonesia. This decision aims to push investment to areas with low electrification rate, especially in isolated areas. This is how we realize the energy justice vision through ensuring energy access. However, we know there are problems in the implementation. But that's a business to business problem between PLN and the private sectors. The government cannot intervene there'

Despite the efforts to set a geographically differentiated price, in the very same regulation, the government includes provisions that discourage private energy investments. These provisions stipulate that with the exception of geothermal and hydropower, renewable energy sources are subject to a maximum price ceiling of 85 percent of the local electricity production cost (*Biaya Pokok Produksi/BPP*) if the cost is higher than the national generation cost. This regulation is widely regarded as discriminatory against renewable sources because non-subsidized renewable energy must compete with subsidized fossil fuel power generation [40,51].

Further, the current regulatory framework also fails to distinguish the scale of investment. Therefore, the amount of time and costs invested to comply with the regulatory framework is similar, regardless of the scale of investment. Accordingly, while the policies and regulatory frameworks include provisions to address distributional injustice of electricity provision, particularly in terms of affordability and accessibility, they also include provisions that produce counterproductive effects, providing disincentives to address the very problems that distributional justice policies aim to rectify. Whether this approach is partly motivated by a desire to protect PLN's business, which is still heavily based on coal power generated plants, as some suggest, is an open question (interview NGO activist #5, 11/2/2019).

A closer look at renewable rural electrification projects reveals instances where such projects may actually perpetuate local distributive injustice in electricity access. In Sidenreng Rappang District, for instance, the electricity generated from the wind farm supplies the electricity access to households with access to a grid network, particularly in the city area. However, villagers living around the facility remain without access to electricity. While electricity access has increased at the district level, the needs of communities living close to the infrastructure site have been neglected. This situation has led villagers to demand that the private company operating the facility provide the electricity to villages. As described by a company representative (interview private sector #9, 27/3/2019),

'The villagers assumed that when this facility was built, they would immediately get access to electricity. We cannot do that because it is PLN's responsibility for the transmission and distribution of the electricity, which goes to those connected to grid network'

The case above suggests that realizing distributive justice (ensuring equal access to electricity) necessitates attention to spatial distribution of electricity access not only at the national and regional scale but also at the local level [23]. Further, paying attention to different energy needs and demands for various social groups is also crucial when designing and implementing policies and programs to address energy poverty.

5.2. Procedural justice

Due process is an essential element of procedural justice [22]. Its principal focus is on ensuring stakeholders' participation in energy decision making processes, including measures to ensure meaningful participation in and transparency of the decision making process such as informational disclosure and requirements for public consultation at various levels. Yet in practice, this study reveals that procedural injustice is prevalent in energy decision-making processes. Most private sector informants argue that while transparency and due process is essential to attract private climate investment, these attributes are often lacking in the renewable energy sector.

In particular, key informants report that the current procurement and bidding processes for renewable energy projects are unclear due to lack of transparency and insufficient predictability. All private companies that wish to participate in the bidding process need to be listed in a registry established by PLN through a lengthy and unclear screening process. Such a process has screened out most domestic and small-scale private companies with limited capital and experience in implementing renewable energy projects, notwithstanding that some of them are technically advanced and well qualified to undertake the work. As elaborated by a private company informant (interview private sector #9, 27/3/2019):

'The government continuously changes the procurement policies for IPPs [Independent Power Producers]. In the past [before MEMR 50/2017], it was conducted through a direct appointment. Here, the developers could actively propose projects that fit with PLN's business plan for electricity generation. Now, we need to get through a limited tender process. While the intention is to make the procurement process more transparent, the criteria used by PLN to select companies that could participate in the tender process is very unclear'

Such opaque procurement processes also create ample room for corruption. WRI [52] reports that the government continues to sign private contracts with IPPs without clear public and regulatory oversight. In the non-renewable energy sector, several corruption cases have emerged in the last few years, including a 2019 bribery case in the establishment of a coal power plant involving the PLN chief [53].

The powerful position of PLN, which holds the rights of first refusal on all new electricity generation capacity (as stipulated in the Electricity Law of 2009) also creates limited room for other stakeholders to meaningfully participate in the decision-making process. A private sector informant comments (interview private sector #1, 7/3/19),

'We are really frustrated with the lack of transparency and commitment of PLN...No advocacy for the private sector involvement in electricity sector. Private sectors are the last persons you want to collaborate with. That is always that kind of sentiment. With the monopoly, they [PLN] can make their own decision without any public consultation'

In another case, tokenism is also observed in the government's efforts to demonstrate private sector participation in the renewable energy sector. For example, when the government issued a regulation on Renewable Energy Power Generation (MEMR Regulation 50/2017) that aims at attracting private sectors' investment, it also included counterproductive provisions that actually discourage such investment. Predictably, this generated a backlash from various stakeholders [40,51]. Similarly, the renewable energy price set in the regulation is considered by private sector informants too low for the developers to earn a

reasonable profit and recover their investment (interview private sector #1, 7/3/2019 and private sector #7, 11/3/2019). Moreover, it requires all types of renewables to follow the Build, Own, Operate, and Transfer (BOOT) scheme, under which power plant assets cannot be used as collateral.³ This creates another challenge for small IPPs as they do not have other assets capable of being used as collateral. To counter the backlash, the MEMR organized a public signing event of 64 Power Purchase Agreements (PPAs) in 2017 [54]. However, key informants suggest that the public signing process was introduced with such haste that the private sector was unable to effectively engage in any discussion concerning the content of the agreements. They further argue that some companies have been pressured to sign PPA agreements without being fully informed of their terms or their implications. As described by a key informant (interview NGO activist #4, 6/3/2019),

'The signing event was used to signify that the regulation manages to attract private investments. That was after the backlash from the industries and civil society. We were open about our reservation [toward the regulation] and directly conveyed our concerns to the president. It was really a big mistake. I think the Minister used the event to prove us wrong by signing nearly 70 PPAs.'

These informants suggest that the public PPA signing event was inappropriately used to demonstrate that the newly stipulated regulation was effective in attracting investment, and was being used to deflect public criticism. Given the lack of understanding of and unclear nature of many of the terms of these agreements, it is not surprising that nearly half of the signed PPAs could not reach financial close [55].

To ensure procedural justice, communities need to be involved in the decision making process on project issues that will affect them through obtaining their prior and informed consent and engaging with them meaningfully in the consultation process, such as during environmental and social impact assessment [22]. However, this research finds that opportunities for the public to effectively engage in the decision-making processes regarding renewable electrification are severely limited in relation to multiple levels of energy decisions. As a result, there is considerable procedural injustice in the establishment of renewable infrastructure. Particular procedural injustice issues arise with regard to large-scale hydropower plants, which the Indonesian government treats as part of its renewables portfolio that contribute to the country's ambitious carbon reduction commitment under the Paris Agreement [56].

For example, take the establishment of Batang Toru Hydropower, a controversial large-scale hydropower project developed in North Sumatra Province which is expected to generate 510 MW of power. Based on MoEF Regulation 17/2012, all entities that build infrastructure in Indonesia, including renewable energy infrastructure, are required to obtain an Environmental Impact Assessment/EIA. To obtain an EIA, an entity must involve all stakeholders and provide them with equal opportunities to participate in the EIA process. It must disclose complete information on the project's risks and benefits to ensure meaningful stakeholders' participation. Yet, in the case of Batang Toru Hydropower, neither public participation nor informational disclosure on project risks and benefits were effectively provided. The project was developed without proper consultation with various stakeholders and has met strong opposition particularly from environmental activists and communities living around the project location (interview NGO #1, 10/1/2020). Communities argued that the project could disenfranchise them because it would significantly restrict their access to local watersheds for agriculture irrigation, while environmental activists suggest the project will endanger Orangutan habitat [57,58]. The project managed to obtain an EIA approval despite strong opposition from communities and

³ The BOOT requirement has been removed in the recent revision of MEMR 50/2017 (MEMR No 4/2020). However, the geographically differentiated price set in MEMR 50/2017 remains unchanged.

NGOs. As civil society's attempt to legally contest the construction of the power plant in the court failed, the project is currently underway. A government officer suggests that the project has obtained all necessary requirements to be carried forward despite the opposition (interview, government officer #8 14/01/2020),

'We acknowledge the public oppositions toward the project as feedback to the project, but there is no reason for us to stop it because the project has met all legal requirements as stipulated by the law.'

The cases above show procedural injustice occurs not only through limited public informational disclosure and transparency but also as a result of the limited space provided for the public to participate in energy decisions. The failure to address procedural injustice also produces unintended consequences. In particular, the lack of transparency and due process in the renewable energy sector has hampered the mobilization of private investment. Moreover, the limited space for public participation in the processes for renewable infrastructure development generates social risks such as exclusion and disempowerment of those targeted as beneficiaries of renewable infrastructure. As described above, the inability to attend to procedural justice could also result in environmental risks.

5.3. Recognition justice

Recognition justice highlights the need to ensure the complete and equal political rights of different social groups and identities [19]. Doing this requires recognizing the vulnerability of those underrepresented/misrepresented in decision-making processes, and hence potentially disenfranchised by renewable energy projects. In Indonesia, the majority of people who remain without electricity live on outlying islands or in other remote areas and many are indigenous people and minority groups. They continue to face discrimination and to be denied access to basic public services such as health, education and access to energy [59,60].

In such places where logistical problems and a sparsely distributed population preclude grid-based solutions, small scale, off-grid and distributed renewable technologies offer a cost-effective means to provide access to energy with low climate impacts [30,41]. Yet, the government's renewable electrification program currently focuses on large scale and on grid electricity infrastructure. In 2018, for instance, a total 9.4 GW of on grid power plants have been established which included large hydropower (60 percent), geothermal (20 percent), small hydropower (5 percent) and bioenergy (3 percent), while solar and wind each contributed less than 1 percent of total capacity [61]. At the same time, the government has only installed 28.2 MW of solar PV, 480 kW of wind energy, 6.38 MW of micro hydro off grid system and distributed energy saving lamps to electrify rural areas [62].

Key informants suggest that such an approach could potentially deny the rights of people to energy access and infringe the principle of recognition justice. In Indonesia, the ability to access reliable electricity has been an important measure for the population to gauge the state's recognition of people's rights and aspirations to modernity [63]. Frustrated by the slow progress of renewable rural electrification, a local government officer in eastern Indonesia suggests (interview government officer #7, 22/3/2019),

'The central government focuses only on big projects with big returns. It prioritizes big scale projects in particular geographic areas as a part of the 35,000 MW program to supply electricity. But, the government forgets that there are people who are not living in those areas and are in need of electricity. The government needs to fulfil people's rights to electricity. It needs to come first. Afterward, the government could run the electricity as a business enterprise. After all, we are still Indonesian citizens, aren't we?'

In addressing energy poverty, PLN is in a somewhat difficult position.

On the one hand, the company is responsible for providing affordable electricity access for all people in Indonesia. On the other hand, as a state-owned enterprise (*Badan Usaha Milik Negara/ BUMN*), it is required to generate profits. The company needs to report to three ministries, namely the MEMR, the Ministry of State-Owned Enterprises, and the Ministry of Finance, which often have contradictory policy priorities [31]. In navigating these tensions, price and profitability remain key considerations for the company, particularly when establishing electricity infrastructure. As described by a key informant (interview officer of state-owned company, 19/03/2019),

'For renewable energy, hydropower is favourable because the generation cost is significantly cheaper than other renewable sources such as wind and solar and it provides more stable supply of electricity. After all, we seek the most affordable energy sources to increase rural electrification'.

The consequences in terms of recognition justice are considerable. Areas considered economically unfeasible for investment continue to be neglected and consequently denied electricity access. This problem is compounded by PLN's deep commitment to fossil fuel-based power generation and resistance to change. This is exacerbated by PLN's role as a fuel supplier for diesel generators and has inclined PLN to retain diesel-based power generation in rural areas [40], notwithstanding the economic and environmental benefits of a switch to renewables.

One consequence is that remote areas where grid-based (and by implication fossil fuel based) generation is not economically viable are denied the cheaper and more viable renewable energy alternative. This trend is apparent on Sumba Island where diesel-based power far exceeds the renewable plants despite an in-principle commitment to electrify the island entirely using renewable energy sources. Indeed, viewing electricity access purely through an economic lens could lead to the failure to address energy poverty, particularly in the areas deemed unattractive to investors.

Recognition justice emphasizes the need to pay particular attention to those affected, ignored and misrepresented in the decision-making processes [9,18]. In the case of community small scale and distributive renewable energy projects, the inability to recognize power relations within communities and local social structures could lead to failure to recognize those who might be disenfranchised from projects. In Sumba Island, for instance, participation and access to electricity are influenced by local social stratification. As a consequence, three social groups can be identified, which include *Maramba* (noble group, the masters), *Kabihu* (free people) and *Ata* (the slaves or servants) [64]. *Maramba* holds a higher position in the social strata in Sumba due to their authority and control over other groups. Fathoni et al. [64] finds that participation in decision-making processes and access to renewable energy services are strongly determined by existing social stratification in the community. Most strikingly, renewable rural electrification projects often exclude *Ata* people from decision-making processes and electricity access. In this case, because of little or no recognition of the power relations embedded in the culture or of social structures within the community, people with lower economic and social status have been marginalised, which further results in their exclusion from gaining the benefits of energy services. Such findings have been seen elsewhere, particularly in developing countries [see 18,24].

5.4. Discussion

Indonesia has strived to realize its energy justice vision through numerous policies and programmes. In the electricity sector, such a vision has translated into policies and initiatives to accelerate rural electrification using low carbon technologies and through encouraging and facilitating private participation and investment in the renewable energy sector. These are laudable aspirations but the reality on the ground is rather different. Viewed through a justice lens, a very different picture emerges—one that suggests that the pursuit of energy justice is

being undermined in multiple ways, as elaborated below.

In terms of distributive justice, the government's ambitious target to reach universal electrification has led to a narrow interpretation of energy justice which focuses on the distributive justice aspect, particularly energy accessibility and price affordability. The aspiration to increase energy accessibility through rapidly electrifying rural areas has also led to the formulation of policies that prioritize the establishment of large-scale infrastructure and grid expansion. While there is no doubt that such an approach could aid the country to meet its fast-growing energy demands and could quickly ramp up the countries' electrification ratio, such a solution might not be feasible for most energy poor areas, especially in remote and outlying islands where geographical challenges preclude grid-based solutions. Consequently, it could lead to the failure to address distributive justice by reinforcing spatial inequality of electricity access.

Prioritizing price affordability also leads to the formulation of policies and regulations that set up a low price for renewable energy. Consequently, potential investors and developers of renewable energy projects can only make a reasonable investment return with projects at a significant scale in which they can bring cost under local electricity cost production (BPP) and make a reasonable investment return. Overall, the consequence of the current regulatory regime is to impose substantial disincentives on small investments in rural electrification projects, both by making them too costly to be viable and by cutting off viable sources of finance. Far from facilitating initiatives where energy poverty might best be mitigated through creating small and distributed renewable energy solutions underpinned by small scale investments, current policies impose strong disincentives, and few if any ideas get beyond the drawing board.

This problem is exacerbated by the limited financial options available, particularly for small scale and distributed renewable energy projects. Access to finance for large scale renewable projects is easier due to the greater availability such projects have to attract finance from both international and domestic sources. However, small-scale renewable energy projects typically have to rely on a limited range of domestic financial sources. Yet, the Indonesian financial market is relatively small and dominated by a banking sector that typically relies on short-term deposits to fund its lending operations [37,51]. Moreover, several factors still predominantly shape investment decisions, such as project feasibility and cost, rate of return and the credibility of project developers. In this manner, the current trend of renewable infrastructure finance in Indonesia directs energy transition futures toward a highly centralized system replicating the social and political inequities characteristic of fossil fuel-based power generation [13,65]. While the global narrative on climate finance often emphasizes private financial flows as an important means for transition to low carbon development [5,7], this finding suggests that relying solely on private finance might endanger the pursuit of just and equitable energy transitions.

The focus on price affordability also shapes policies that favour the 'cheapest' energy source, either from renewable or non-renewable resources. These policies have benefited fossil-fuelled power plants, especially coal which continuously receives significant subsidies from the government to make it affordable [40]. If such a policy priority continues, it will jeopardize the country's broader agenda to transition to low carbon energy. This in turn could undermine the pursuit of energy justice in which the use of sustainable energy sources is a crucial element [22].

With regard to procedural justice, the current regulatory regime and institutional arrangements in the power sector, including those that purport to alleviate energy poverty, concede limited space for the public to participate in decision-making processes. Crucially, the monopolistic nature of the state-owned company leaves limited room for other stakeholders to participate in electricity decision-making processes. Inadequate access to information and a non-transparent process for project development and implementation are further procedural obstacles encountered by the renewable energy sector. Procedurally, some

regulatory frameworks do explicitly require meaningful participation by communities and broader stakeholders, such as during Environmental Impact Assessment (EIA). In practice, however, the EIA is often reduced to a system of administrative checklists that effectively exclude participation and so preclude rather than facilitate procedural justice. Procedural justice is likely to be further constricted as a side effect of current initiatives to reduce bureaucratic procedures which are widely viewed as constraining private investment. In short, the pursuit of efficiency may indirectly reduce procedural justice, as with a proposal to remove the EIA component from business permit requirements [66].

In terms of recognition justice, the current efforts to transition away from fossil fuel-based power generation presents a clear example how a narrow interpretation of energy justice could reproduce forms of disempowerment and inequality. It is clear that policies and programs to rectify energy poverty have been formulated without sufficiently including the voices and needs of their supposed beneficiaries. Their exclusion from the design and implementation of policies and programs leads to further marginalization of energy poor communities, many of whom are indigenous and minority groups. While Indonesia's energy justice vision emphasizes seemingly inclusionary politics, on closer scrutiny, implementation at different levels reveals various forms of exclusion that could limit indigenous, minority and lower economic level groups from energy services and provision.

In sum, Indonesia's energy justice vision has manifested in policies and programmes that are partly grounded in the notion of distributive justice, seeking to provide affordable and accessible energy to all people. Yet such an approach has led to policies that favour large scale and on-grid solutions and limit financial options for small and distributed renewable energy initiatives, resulting in perpetuating spatial inequality of electricity access. Further, the inability to address energy needs of different social groups and recognize those prone to be disenfranchised in the energy system leads to policies that do not provide and effectively implement procedural mechanisms to assure their meaningful participation in energy decisions. The finding demonstrates the weakness of such a 'silo' approach to energy justice, which hampers the achievement broader energy justice concerns. It also highlights the importance of recognizing the link between the three dimensions of energy justice to remedy energy injustice [20,67].

6. Conclusion

This article contributes to and advances the body of literature on energy justice and financialization of energy in the Global South, particularly in Southeast Asia, an area that remain underexplored. By revealing the social justice implications of renewable rural electrification financialization in Indonesia, this study challenges the assumption on the neutral impacts of financing transition to low carbon energy, as also observed elsewhere [11]. Further, this article demonstrates the ways existing institutions and power relations [34] shape the interpretation of energy justice vision in policies and programs, which in turn reproduce energy injustices. While on paper Indonesia has embraced the vision to achieve energy justice, the recalcitrance of the monopoly electricity provider, PLN and its deep commitment to fossil fuel generation have resulted in policies and programs that continue promoting large scale and on grid fossil fuel based electricity to tackle energy poverty. Moreover, realizing Indonesia's energy justice vision cannot be achieved solely by addressing distributive justice. This article provides empirical evidence that such a myopic translation of the energy justice vision has produced unintended consequences such as perpetuating spatial inequality and reinforcing the exclusion and disempowerment of energy poor communities from energy decisions.

The findings of this article suggest four important insights on the ways to better integrate elements of justice into policies and practices. *First*, energy policies need to adopt more inclusive approaches for transitioning to low carbon energy. These could include developing and implementing measures to enhance transparency, due process and

public participation. Such measures provide an avenue to pursue recognition and procedural justice and to integrate normative justice values into energy policies. Special attention is needed to accommodate energy poor communities, particularly indigenous and minority groups, and accordingly energy policies and initiatives should encompass local culture, traditional knowledge, preference and capacities. Oftentimes, distributive and recognition justice could only be achieved through procedural innovations, such as constitutional acknowledgement of indigenous communities' rights and a duty to consult with indigenous communities in the EIA process, which provide space for meaningful participation for those long discriminated against in the decision-making processes [26].

Second, energy policies need to encourage and incentivize diversity of solutions to address energy poverty beyond large-scale and on grid solutions. As this study has demonstrated, current incentives result in only large-scale renewable energy projects being viable. The result is substantial pockets of energy poverty will remain, particularly in archipelagic nations like Indonesia, where much energy poverty is found in areas that only small scale and distributed renewable energy solutions could potentially reach. Institutional barriers, particularly those relating to the monopoly of the state owned company, also need to be addressed to allow broader stakeholder participation in the energy system. However, without political leadership, any policy reforms to transition to low carbon energy might be stillborn.

Third, the findings also offer a lesson for addressing energy justice in archipelagic countries like Indonesia. As elaborated earlier, ensuring energy access for all does not necessarily mean applying similar approaches in addressing energy demands of different social groups and communities in different geographies. It necessitates diverse solutions in terms of scale, technologies and approaches that are contextually grounded and best suited to local aspirations and needs.

Finally, this article highlights the need to critically examine the role of private climate finance and how it is engaged in mitigating energy poverty. Addressing energy poverty will likely require diverse sources of finance beyond those structured exclusively by risk and return calculus and bankability considerations. This finding emphasizes the importance of reengaging with the role of public finance, particularly through strategizing how public finance can meet the needs of the most vulnerable. Ultimately, as countries around the globe continue to enrol diverse forms of finance for a transition to low carbon energy, critical studies must continue to scrutinise how policy and practice play out, especially in developing countries and explore avenues for ensuring equitable and just energy transitions in particular political and economic contexts.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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